CLAIMS

[1] A thermoacoustic apparatus comprising a first stack sandwiched between a first high-temperature-side heat exchanger and a first low-temperature-side heat exchanger and a second stack sandwiched between a second high-temperature-side heat exchanger and a second low-temperature-side heat exchanger in the inside of a loop tube, wherein a standing wave and a traveling wave are generated through self excitation by heating the first high-temperature-side heat exchanger, the second low-temperature-side heat exchanger is cooled by the standing wave and the traveling wave, or/and a standing wave and a traveling wave are generated by cooling the first low-temperature-side heat exchanger, and the second high-temperature-side heat exchanger is heated by the standing wave and the traveling wave, the thermoacoustic apparatus characterized by

comprising a mixing device for injecting and mixing a working fluid different from a first working fluid after the first working fluid is enclosed in the inside of the loop tube.

[2] The thermoacoustic apparatus according to Claim 1, wherein the mixing device is a device for injecting the working fluid, which has a low sound velocity, afterward into the working fluid, which has a high sound velocity, enclosed in the loop tube in advance.

[3] The thermoacoustic apparatus according to Claim 1, wherein the mixing device is a device for injecting the working fluid, which has a large specific gravity, afterward into the working fluid, which has a small specific gravity, enclosed in the loop tube in advance.

[4] The thermoacoustic apparatus according to Claim 1, wherein the mixing device is a device for injecting the working fluid, which has a large Prandtl number, afterward into the working fluid, which has a small Prandtl number, enclosed in the loop tube in advance.

[5] The thermoacoustic apparatus according to Claim 1, wherein the loop tube comprises a plurality of linear tube portions, which stand relative to the ground, and connection tube portions connected between the plurality of linear tube portions, and the mixing device is disposed above the center of the loop tube.

[6] The thermoacoustic apparatus according to Claim 1, wherein the loop tube is configured to be bilaterally symmetric and comprise a plurality of linear tube portions, which stand relative to the ground, and connection tube portions connected between the plurality of linear tube portions, and the mixing device is disposed at the center of the upper connection tube portion.

[7] The thermoacoustic apparatus according to Claim 1, wherein a sound detection device for detecting generation of

a sound is disposed, and injection of the working fluid is started when the generation of the standing wave and the traveling wave is detected by the detection device or when a variation in the acoustic wave state is detected.

[8] The thermoacoustic apparatus according to Claim 1, wherein a pressure measuring device for measuring a pressure in the loop tube is disposed, and injection of the working fluid is stopped when a predetermined pressure is measured with this pressure measuring device.

[9] The thermoacoustic apparatus according to Claim 1, wherein the mixing device stops the injection of the working fluid on the basis of the variation over time of heat output from the second high-temperature-side heat exchanger or the second low-temperature-side heat exchanger.

[10] The thermoacoustic apparatus according to Claim 1, wherein the working fluid resulting from mixing comprises a working fluid lighter than air and a working fluid heavier than air, and an opening portion for releasing the working fluid heavier than air is disposed at the lower end of the loop tube.